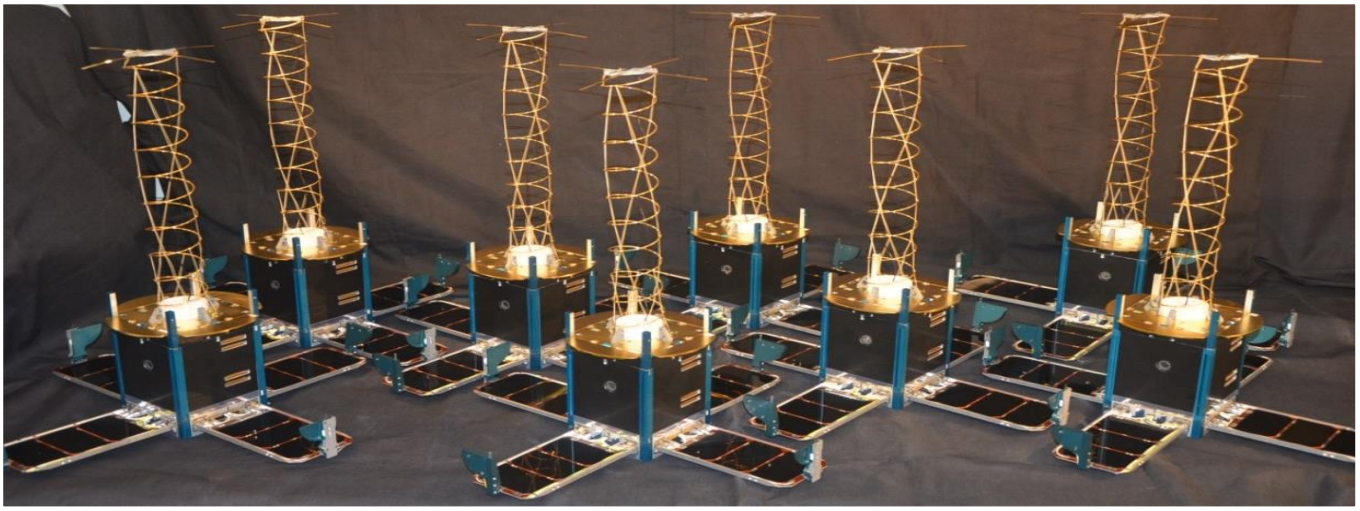
Los Alamos National Security, LLC Request for Information on how industry may partner with the Laboratory to commercialize Laboratory-developed Agile Space Platforms



Los Alamos National Security, LLC (LANS) is the manager and operator of the Los Alamos National Laboratory for the U.S. Department of Energy National Nuclear Security Administration under contract DE-AC52-06NA25396. LANS is a mission-centric Federally Funded Research and Development Center focused on solving the most critical national security challenges through science and engineering for both government and private customers.

INNOVATIVE MICRO & SMALL SPACE VEHICLES (SV)

Los Alamos has a decades-long presence in space as part of its non-proliferation, treaty verification, and larger global security missions. Part of this capability includes the Agile Space Platform (ASP): a unique approach to alternative and small-space technology. In 2010 and 2013, respectively, LANS launched constellations of 4 and 8 nanosatellites that were entirely designed, built, and operated by the Los Alamos National Laboratory, in conjunction with mission partners at the U.S. Special Operations Command. [1] LANS established and maintained contact with the 4-satellite vehicle (SV) constellation (Perseus) throughout its orbit lifecycle, and is now communicating with and actively tasking the next-generation 8-SV constellation launched in 2013 (Prometheus). Prometheus is expected to remain on orbit for three years. The Prometheus system includes a unique, scalable satellite vehicle architecture, reprogrammable software–defined radio, and modular, cost-effective and highly mobile ground stations and field units. Although this particular mission only required 1.5U cubesat space vehicles, LANS's unique design and validation process enables a fully scalable architecture.[2] The Prometheus SV design lends itself to flexible

[1] For additional information please see the following article: The Space Review, last modified April 14, 2014, accessed July 14, 2014, http://www.thespacereview.com/article/2491/1.

[2] By convention 1U equals (10 cm)^3

scaling and with minimal additional design work, the system can be configured for SV sizes ranging from 1U to small ESPA class satellites. LANS is currently investigating a 1.5U payload hosting capability to be added, via a simple connecting interface, to the proven 1.5U Prometheus SV. This will allow a small satellite constellation the option of including one or more payloads for additional functionality to meet a variety of mission goals.

ASP represents a revolutionary approach to satellite development. Built from readily-available commercial parts, the ASP system allows for a modular, scalable, and customizable system in which a space vehicle, field unit, and ground station can be developed from proposal to operations in a matter of months at much reduced cost. The ASP design lends itself to rapid prototyping and testing of its systems on the ground, which in turn significantly minimizes the timelines and costs associated with a launch. Furthermore, the speed and agility of the ASP lifecycle ensures that each vehicle has the latest hardware and software capabilities on board. On-orbit operations are completely automated and software platforms are reconfigurable post-launch to accommodate changing business/operational paradigms at any point during mission operations. The ASP is a mechanism for rapid innovation cycles, and quick response to mission needs in the greater aerospace and defense industries.

LANS has a long successful history fulfilling its larger space mission over its long history, most recently with the successful deployment of the Prometheus system for the U.S. Special Operations Command. In order to ensure that the national security enterprise always has access to the best capabilities and technology available, LANS is actively exploring the possibility of one or more private partners to assist in the development and growth of small satellite and space technology for both government and commercial users. In particular, LANS is exploring multiple mechanisms for ensuring the vitality of its internal research and development program for government customers while accelerating the design, production, fabrication, and testing cycles by partnering with at least one private entity. Accelerating innovative concept to capability cycles will allow LANS and its partners to rapidly deliver cutting edge solutions to national security customers and re-purpose many of the same benefits for the emerging U.S. commercial aerospace market.

POTENTIAL AREAS FOR PARTNERSHIP

LANS has identified several areas for potential partnership to advance the ASP platform:

- Advanced Materials
- Scalable Fabrication
- Data Analytics (private sector)
- Launch Logistics/Services
- Communications (FCC, regulatory)
- Automated Assembly, Testing & Checkout
- Attitude Determination & Control Systems
- Power Systems (solar, battery, radioisotope)
- Data Analytics (government sector)
- Propulsion
- Advanced Sensors
- Encryption/Security

Please note that the foregoing table is non-exhaustive, and LANS is open to commercial collaboration in any suitable field that supports the Laboratory's primary mission deliverables. To that end, LANS is opening this formal Request for Information to private industry to gauge the level of interest and potential for collaboration in advancing the ASP. This offering is made without prejudice to any form of agreement, collaborative arrangement, alliance, number of entities, or partnering mechanism. Those companies interested in pursuing this opportunity should direct a Letter of Interest, as well as any comments or questions, to the undersigned on or before 11:59 MDT on Friday, September 5, 2014.

Attached you will find (1) a listing of LANS Intellectual Property (IP), and (2) certain partner attributes that LANS prefers. Please properly mark any information that is considered proprietary or business-sensitive. LANS will supply a Non-Disclosure Agreement to any U.S. company or person that requires it.

LANS INTELLECTUAL PROPERTY

Patent Applications (in process):

Agile Space Platform

- S-133,133: Space vehicle chassis
- S-133,180: Space vehicle electromechanical systems
- S-133,181: Space vehicle bus system
- S-133,182: Space vehicle attitude control system
- S-133,183: Space vehicle modular functional board system
- S-133,184: Space vehicle ground command and control system
- S-133,185: Modular design for a customizable space vehicle

LANS has also amassed a significant portfolio of IP in the following areas that may be of interest to a partner: advanced materials, instrumentation, remote sensing/imaging, power systems, propulsion, encryption, reconfigurable soft/hardware, machine learning, and artificial intelligence.

Please note that the U.S. Government retains a worldwide, royalty-free, non-exclusive right to practice any LANS-owned patents and/or copyrighted software. Accordingly, any and all partners will have open access to any LANS patents and copyrights in performance of a Government contract.

PREFERRED PARTNER ATTRIBUTES

- Ability and/or desire to fabricate space vehicles and/or integrate custom hardware to the satisfaction of the national security customer in addition to non-government customers
- Can deploy flexibility of the ASP design to accommodate a variety of payloads for multiple needs in the defense and aerospace industry
- One or more U.S. persons with whom LANS personnel may interact
- Ability and willingness to ensure compliance with US Export Control law is a requirement
- One or more U.S. persons cleared at the TS(Q)/SCI level to interact with LANS and/or U.S. government customers
- Ability and/or desire to at least partially locate and/or operate within the Northern New Mexico in close proximity to Los Alamos, Santa Fe, and/or Albuquerque

The foregoing are negotiable preferences; LANS welcomes all Letters of Interest from any suitable party.

WHAT WE ARE REQUESTING

Please submit a written response on how your organization envisions utilizing this technology in partnership with Los Alamos. This may include a business or product plan, a business model, or information regarding your company with contact information. We look forward to reviewing your ideas on how together we can rapidly advance small-satellite technology and deliver innovative capabilities to both the government and private sector. Please respond by email to space@lanl.gov, or call Michael Erickson directly at (505) 667-8087 by September 5, 2014. You will be contacted in a timely manner upon receipt of this information.